Australian Government

Australian Centre for International Agricultural Research

15 Steps for Aquaculture Farm Rehabilitation in Aceh, Indonesia

Food and Agriculture Organization of the United Nations

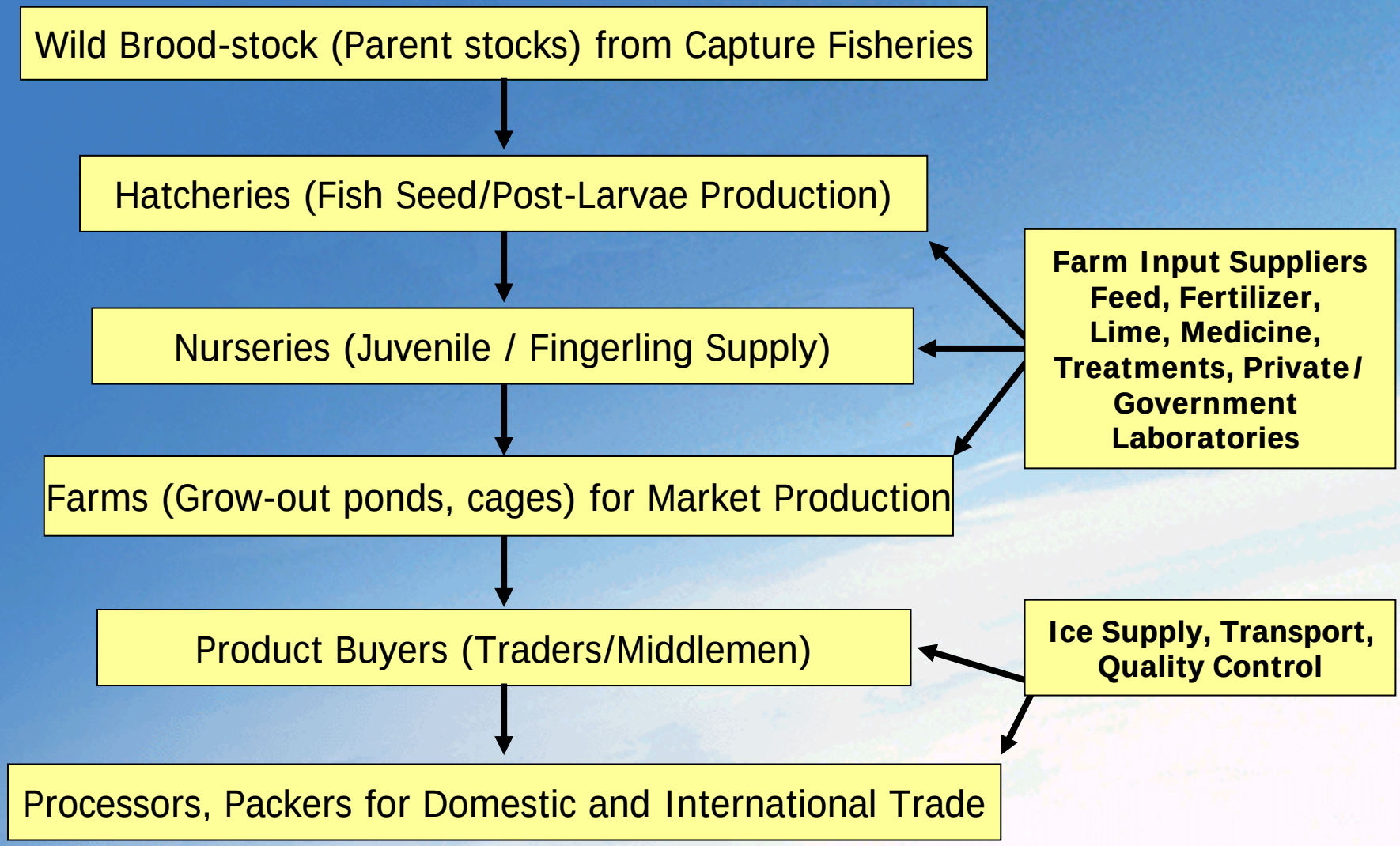
Regional Brackish Water Aquaculture Development Center, Ujung Batee, NAD

P. A. Padiyar, M. J. Phillips, R. P. Subasinghe, S. Raharjoh, Hasanuddin and J. Sammut

Contents

1. Components in commercial coastal aquaculture
2. Pre-tsunami aquaculture problems
3. Key points for successful aquaculture rehabilitation post-tsunami
4. The “15 Steps” for rehabilitation of aquaculture in Aceh
5. Draft environmental principles for rehabilitation of tambaks

Components
in Commercial Coastal Aquaculture



Problems
During Pre-Tsunami Era

- Farmers and supply chain is highly unorganized
- Lack of proper planning and systematic approach.
- Shrimp disease epidemics and crop losses
- No reliable scientific information flow to farmers.
- No proper quality control for farm inputs (seed in particular)
- Risks of food quality problems due to use of internationally restricted chemicals
- Decreasing shrimp price and profit margins
- Too much dependence of farmers on traders/middlemen for technical, financial, farm inputs and marketing
- Environmental problems – mangroves losses

Key Points for Successful Coastal Aquaculture Farm Rehabilitation

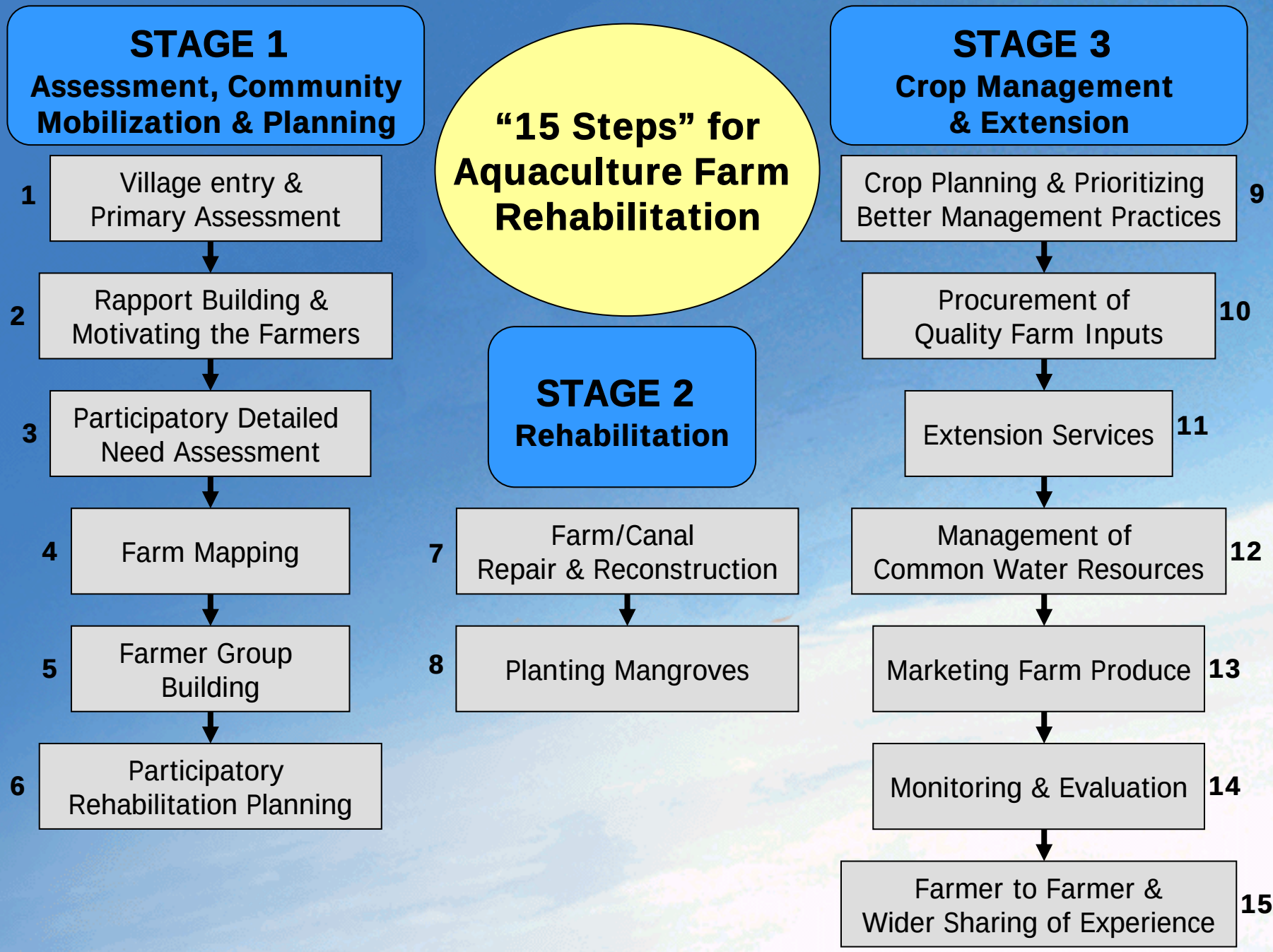
- Proper assessment of the tsunami damage and pre-tsunami problems.
- Participatory approach in planning and implementation of rehabilitation work
- Mobilizing farmers to take ownership of rehabilitation and for collective management

- Educating and motivating farmers for implementation of better management practices.
- Rehabilitation of hatcheries and nurseries for supply of better quality and disease free shrimp and fish seed

Key Points for Successful Coastal Aquaculture Farm Rehabilitation (cont.)

- Restore and strengthen extension services and developing cooperation and mutual trust between all stakeholders
- Improving harvest and post-harvest handling practices for better quality and price
- Linking farmers to markets for better market access

- Implement mangrove and coastal resource rehabilitation as an integral part of rehabilitation of aquaculture areas
- Use the DGA/FAO/NACA guidelines for environmentally responsible aquaculture rehabilitation in Aceh and Nias


STAGE 1
Assessment, Community Mobilization & Planning
1 Village entry & Primary Assessment
2 Rapport Building & Motivating the Farmers
3 Participatory Detailed Need Assessment
4 Farm Mapping
5 Farmer Group Building
6 Participatory Rehabilitation Planning
"15 Steps" for Aquaculture Farm Rehabilitation
STAGE 2
Rehabilitation
7 Farm/Canal Repair & Reconstruction
8 Planting Mangroves
STAGE 3
Crop Management & Extension
9 Crop Planning & Prioritizing Better Management Practices
10 Procurement of Quality Farm Inputs
11 Extension Services
12 Management of Common Water Resources
13 Marketing Farm Produce
14 Monitoring & Evaluation
15 Farmer to Farmer & Wider Sharing of Experience

Step 1:
Village Entry and Primary Assessment

- Identify priority villages for rehabilitation by consulting BRR, Dinas Perikanan in respective Districts and FAO, Banda Aceh for information update.
- Visit the prioritized villages to “walk and talk”
- View the tambak situation
- Discuss with village Head and some key farmers

- Gather general information on pre-tsunami aquaculture situation in the village and feelings of local people on problems in aquaculture and rehabilitation
- Select suitable villages for rehabilitation

Step 2:
Rapport Building & Motivating the Farmers

- Developing mutual trust between farmers and the support team is a long-term process and key to success
- Starts from day one and continues till the end of the project and beyond the project
- Participate in local social function on invitation.
- Keeping very close contact with all the farmers, leaders and village head

- Arranging field trips for farmers to successful farm areas
- Live in the village on a full time basis.
- Leading a simple life so that local people feel free to talk with the support team

Step 3:
Participatory Detailed Need Assessment

- Organize farmer community meeting at farmer convenient place and time to discuss the damages and needs.
- Collect basic information on farming and tsunami damage from farmers using a checklist.
  - Farmer name, residence village
  - Number of tambaks, total farm area (hectares)
  - Ownership (owned/rented)
  - Dyke length (meter), Dyke damage (Severe/Moderate/slight),
  - Water gate condition (Good/bad)
  - Priority species of culture (Shrimp/Milk Fish/Grouper/Crab/other), stocking numbers/ha

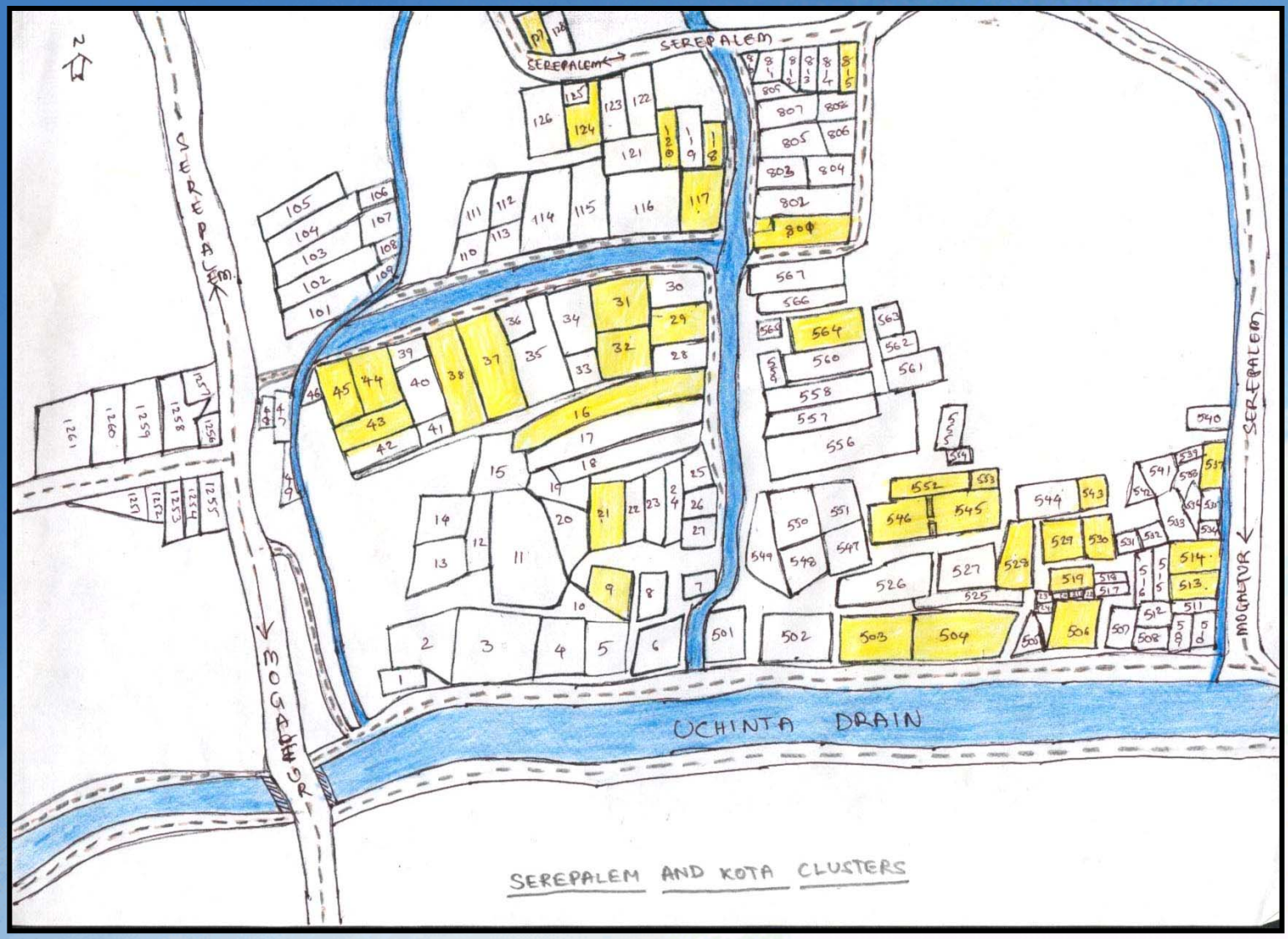
Step 3:
Participatory Detailed Need Assessment (cont.)

- Gather information on farmer expectations
  - Production (kg/ha) of fish/shrimp/crab
  - Size of fish/shrimp/crab
  - Disease prevalence
  - Market price
  - Profit
- Make sure to consider other aquaculture stake holders, like labourers, small-scale traders, nursery seed suppliers, women and men.
- Develop the rehabilitation plan based on inputs of all stakeholders

Step 4:
Cluster Mapping – Mapping the Farm Area

- Draw an approximate map of the ponds, canals, human settlement, road, agriculture field etc in the village. This can be prepared by following 2 methods
  - Farmers draw the map during village meetings
  - Support team staff by walking along farms in the village and drawing the map
- Fix the cluster boundaries - roads, canals, agriculture field etc can form the ideal cluster boundary
- Give three digit unique identification numbers to each pond in each cluster. If possible, use GPS system and GIS maps for precise location of ponds
- Prepare a list of farmers and their pond ID numbers in each cluster

Example of a Cluster Map



Step 5:
Farmer Group Formation

- Farmer groups (AquaClubs) should be mobilized and strengthened.
- Farmers in each group should be neighboring farmers in the farming cluster.
- Each farmer group ideally should have 20-30 farmers for efficient self-management of the Group.
- Each cluster ideally has less than 50 Ha of farms consisting less than 100 Ponds to be managed by farmers in one farmer group
- Each group should select its group leader by Consensus

Step 6:
Rehabilitation Planning

- Select the beneficiary farmers and the farm area to be rehabilitated
  - DGA/FAO criteria
  - Consultation with Group leaders
- Arrange a village level meeting of farmers and the group and inform the name of the selected farmers

- Discuss and agree on crop activities, Better Management Practices to be followed, mangrove rehabilitation and rehabilitation needs in general

Step 6:
Rehabilitation Planning (cont.)

- Estimate the cost of rehabilitation, crop starting and resources needed in consultation with farmer group leaders
  - Dykes and Water Gate Repair and Sludge Removal from Pond Bottom.
  - Labours, Equipments, Mechanical Excavators etc
  - Crop Inputs Per ha (Seed, Feed, Lime, Fuel for Water Pump, Water Conditioners/Treatments).
- Estimate and fix the time frame to repair the tambaks, water gates, water supply canals and starting time for crop activities.
- Make a detailed work plan with time frame for each activity

Step 7:
Farm and Canal Repair/Re-construction

- Soil quality assessment and remediation
  - Check for acid-sulphate soils and plan to manage any potential acidity problems
  - Check for sandy soils
- Rebuild the infrastructure firsts:
  - Water gates and water canals
- Rebuild the farms after the infrastructure
- Dispose of any sediment and debris carefully

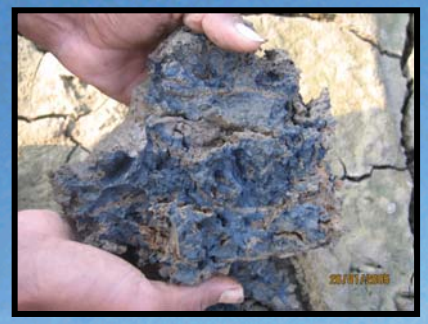
(See the DGA/FAO/ACIAR/NACA Manual on These Topics)

Step 8:
Planting of Mangroves

- On-Site Rehabilitation of Mangroves : Inside the pond in some extensive farming systems, promoting silvofisheries
- Off-Site Rehabilitation of Mangroves: rehabilitate the green belt to protect the shoreline and farming areas

Step 9: Crop Planning & Prioritizing the Better Management Practices

- Arrange a farmer meeting before the stocking date, ideally at least 45 days
- Decide on the dates and duration for pond preparation, seed selection and pre-stocking activities
- Discuss and develop BMPs with the farmer group for the farming area. Use colorful posters/documentaries/leaflets (see FAO/DGA/ACIAR/NACA Manual on BMPs)
- BMPs should be developed using a participatory/consultation process with farmers
- Priority BMPs should be agreed to be implemented by all the farmers at an individual level with group discipline.
- Farming Rules and Regulations should be written down on a paper and all the farmers should be signatories on it.



Step 10:
Procurement of Farm Inputs

- This includes supply of seed, feed, lime, water and soil treatment chemicals, medicines etc.
- Contract system with reputed manufacturers or local dealers is advantageous.
  - Give sufficient time to suppliers to produce farm inputs as per the given **Quality** standards and supply them in required **Quantity** at **Right Time** and at **Reasonable Price**.
  - Working together increases the bargaining power for the farmer group.
- On-farm nurseries should be promoted which is managed locally by farmers and labourers. This assures better quality juveniles for farm stocking

Step 11:
Extension Services

Provide on-farm technical support

- Showing practical methods of implementation of BMPs
- Measure water quality parameters and advise
- Pond bottom quality check-up and advise
- Health and growth check-ups and advise
- Individual farmer problems and advise for them
- Support farmers in maintaining farm records (farm record book should be given to all farmers at stocking)
- Give moral support by a friendly approach

Step 11:
Extension Services (cont.)

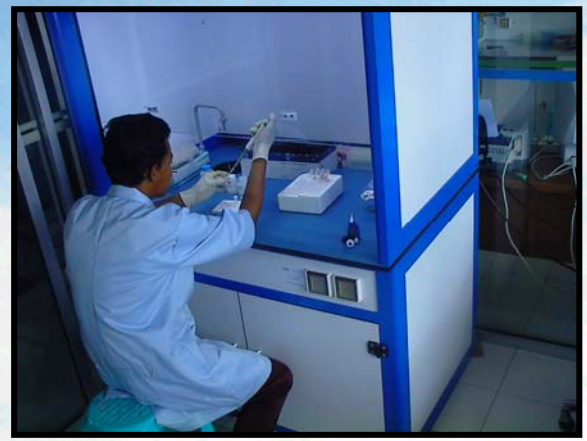
Organize farmer group meetings

- On weekly basis (same day, same time) at farm site
- Review the farming situation and problems for the previous one week
- Identify solutions for any problems in farm and farmer management by discussing with farmers
- Forecast the crop and weather for the next week and plan for the activities, BMPs, to be implemented.
- Invite local farm input suppliers, farm service providers, scientists, successful farmer leaders from other clubs/ villages to the weekly meetings. This motivates farmers and increases knowledge

Step 11:
Extension Services (cont.)

Farmer Service Centres

- Farmer service centres could be established. These can be managed by farmer/leader at Village Level.
- Local Dinas Perikanan hould actively participate.
- In every Sub-District promote a “One Stop Aqua Shop” which could be a place for
  - Information and knowledge
  - Feed and Farm Input Storage
  - Water Quality Testing
  - Health Management and Basic Disease Diagnostic Facility
  - Farmer Meeting Centre For Discussing Problems/Solutions



Step 12:
Management of Common Water Resources

- De-silting and repairing canals on a regular basis – a community approach
- When and how to fill the pond so that all farmers can complete filling of ponds without trouble
- Care should be taken when draining pond water to the canal
  - Inform the Neighboring Farmer if it is Normal Water Exchange.
  - Inform all Cluster Farmers if Discharging the Water from Disease Outbreak Ponds
  - No Farmer Intake Water During Disease Outbreak Situation

Step 13:
Marketing Aquaculture Farm Produce

- Look for ways to develop supply chains based on market requirements.
- Support farmers with market information, eg prices, quality requirements.
- Explore opportunities for accessing better prices and with dealers who practice fair trade.
- Trace-ability of produce should be maintained.
- Assure quality of harvested product through proper icing and hygienic practices.

Step 14:
Monitoring and Evaluation

- Encourage farmers in basic monitoring and record keeping – at farm and group levels.
- Monitoring should be on a regular basis (daily, weekly, crop ending, based on needs).
- Farmer evaluation should be encouraged for self learning by farmers
- Monitor implementation of management practices by farmers on pond-wise
- Crop results should be recorded (production, disease, fish/shrimp size, crop duration, profit etc)
- Data should be compiled with farmers to discuss results and analyzed to understand strong and weak points. This will help in future crop planning and fine-tuning future activities.

Step 15:
Feedback and Sharing the Experiences

- Arrange regular farmer meetings to exchange experiences.
- Invite other local stakeholders to participate in meetings and encourage dialogue along the supply chain.
- Use meetings to evaluate outcomes and share experiences to encourage uptake of better practices among farmers to improve sustainability.
- Share experiences across farming areas to encourage wider uptake of better farming practices.
- Disseminate information on better farming through to wider audiences through newspapers, television etc.
- Supporting agencies (donors, NGO's etc) should be engaged to share experiences through available channels.

Draft environmental principles for rehabilitation of tambaks

Draft principles below are intended to provide a basis to guide rehabilitation of brackishwater aquaculture ponds in Aceh.

These draft principles are based on more generic ¨global¨ principles for management of shrimp farming developed through the World Bank/NACA/WWF/FAO Consortium Program on Shrimp Farming and the Environment1. These global principles are the outcome of a multi-stakeholder process to develop international consensus on what constitutes better management of shrimp aquaculture, here modified/developed based on our current knowledge of the environmental, and social, interactions of shrimp farming in Aceh.

The draft environmental principles for tambak rehabilitation are as follows:

1. Tambak ponds for rehabilitation should be located in areas that are environmentally suitable for fish and shrimp farming. There rehabilitation should not impact on biodiversity, ecologically sensitive habitats and ecosystem functions. Particular attention should be given to minimizing impacts on mangroves. There should be clear legal title to the land, and the land should not be located in any existing or proposed green belt.

Draft environmental principles for rehabilitation of tambaks (cont.)

2. Tambak and water supply reconstruction should be done in ways that do not cause ecological damage, including risks from acid sulphate or disruption of water supplies. Aquaculture designs should as far as possible incorporate buffer areas between ponds and natural habitats such as mangroves. Techniques and engineering practices should be used that minimize erosion, leaching of acid sulphate soils and salinization during rehabilitation and subsequent operation.
3. Water supply systems should be rehabilitated in ways that ensure sufficient water supply and drainage. Care should be exercised to avoid salinisation where tambak ponds are located near agriculture areas. Off-site impacts associated with discharge of effluent and solid wastes should be minimized during farming through good water management practices.
4. Wild broodstock collection and hatchery rearing of shrimp post-larvae and milkfish should not use destructive fishing techniques. Hatchery practices that promote quality and healthy shrimp and fish should be encouraged.
5. Feeds and feed management practices should make efficient use of feed resources. Feed and fertilisers should be used efficiently in ways that maintain pond fertility and do not cause degradation of water quality or affect the health or food safety of farmed shrimp and fish.

Draft environmental principles for rehabilitation of tambaks (cont.)

6. Disease risks for farmed and wild fish and shrimp should be minimised through stocking of ponds with healthy shrimp and fish. Hatchery operators and farmers should be trained in reducing risks of shrimp and fish diseases through adopting simple risk reduction measures, emphasizing maintaining environmental quality.
7. Use of chemicals that may lead to residues or environmental risks should not be used. While antibiotics are not used in traditional farming, some chemicals used for pond preparation are a concern, and alternatives should be found and promoted.
8. Rehabilitation and operation of tambak farms should be done in a way that benefits local communities and the province. The rehabilitation of tambak farms, important for the livelihoods of many people in coastal areas and the priority is to maximize employment and social benefits to communities. Careful consultation and planning is required with communities to maximize benefits and not create social conflicts.
9. Planning for tambak rehabilitation should also consider the cumulative effects of individual ponds, and seek to ensure that developments are within the carrying capacity of the local environment to sustain farming.

Donors:

EUROPEAN COMMISSION

Humanitarian Aid